

IN THE CLAIMS:

1. (Currently Amended) An apparatus for analyzing brain functions, comprising:

biosignal detection means for detecting a biosignal that identifies a waking level of an examinee in parallel with examination of the brain of the examinee in a state without external stimuli conducted by an MRI System;

5 a functioning part location calculating means for obtaining information on an MRI signal strength at each stage where the examinee is in [[a]] predetermined sleeping stage stages 1, 2, 3, 4, and REM and where the examinee is in a predetermined waking stage;

taking a differential of a change in the MRI signal strength considered significant in view of the correlativity with the change in stage; and

10 identifying a portion of the brain functioning in the respective sleeping stage stages 1, 2, 3, 4, and REM from the change in the MRI signal strength taken in each of the sleeping stages 1, 2, 3, 4, and REM.

2. (Cancelled)

3. (Original) The apparatus in accordance with claim 1, wherein the biosignal detection means is configured to detect an electroencephalogram of the examinee as the biosignal.

4. (Previously Presented) The apparatus in accordance with claim 1, wherein the detection of the biosignal of the examinee by the biosignal detection means and the examination of the brain of the examinee by the MRI system are performed alternately.

5. (Currently Amended) A method of analyzing brain functions, comprising the steps of:

detecting a biosignal of an examinee in parallel with examination of the brain of the examinee in a state without external stimuli conducted by an MRI system;

5 obtaining information on an MRI signal strength outputted from the MRI system at each stage where the examinee is in [[a]] predetermined sleeping stage stages 1, 2, 3, 4, and REM and where the examinee is in a predetermined waking stage,

taking a differential of a change in the MRI signal strength considered significant in view of the correlativity with the change in stage; and

10 finding out a part of the brain functioning in the respective sleeping stage stages 1, 2, 3, 4 and REM from the change in the MRI signal strength taken in each of the sleeping stages 1, 2, 3, 4, and REM.

6. (Currently Amended) A system for analyzing brain functions, comprising:

a detection unit for detecting a biological function for identifying a waking level of a patient and outputting a biosignal of the patient;

5 a brain examination unit for detecting a function of a brain of the patient in a state without external stimuli and outputting a brain function signal; and

a location calculating unit for obtaining the brain function signal from the brain examination unit at each stage where the patient is in [[a]] predetermined sleeping stage stages 1, 2, 3, 4, and REM and where the patient is in a predetermined waking stage by taking a differential of a change in strength in the brain function signal considered significant in view of
10 the correlativity with the change in stage, and determining which portion of the brain is

functioning in the respective sleeping stage stages 1, 2, 3, 4, and REM from the differential of the brain function signal taken in each of the sleeping stages 1, 2, 3, 4, and REM.

7. (Previously Presented) The system of claim 6 wherein the location calculating unit calculates a location based on a correlation between time-series data of the biosignal and a change in value of the brain function signal.

8. (Previously Presented) The system of claim 6 further including an event identification support unit for identifying an event corresponding with the biosignal.

9. (Previously Presented) The system of claim 8 further including a heart monitor unit to detect heartbeat noise wherein the event identification support unit can eliminate heartbeat noise.

10. (Previously Presented) The system of claim 9 wherein the brain examination unit provides an MRI signal and the event identification support unit receives an electroencephalograph signal and the event identification support unit includes a noise elimination section and a frequency analyzing section for outputting a display of data on the
5 frequency of occurrences of an event.

11. (Previously Presented) An apparatus for analyzing brain functions comprising:
a biosignal detection unit for monitoring an examinee and providing a plurality of biosignals representative of both a predetermined waking stage and a predetermined sleeping stage of the examinee;

5 an MRI unit for taking a plurality of MRI image signals of a brain of the examinee in correlation with the provision of the biosignals from the biosignal detection unit;

means for identifying a specific MRI image signal of the examinee's brain in a state without external stimuli in both the predetermined waking stage and the predetermined sleeping stage based on correlated biosignals; and

10 a functioning brain part location unit for comparing the MRI image signals to identify the location of a functioning part of the brain in the sleeping stage.

12. (Previously Presented) The apparatus for analyzing brain functions of Claim 11, wherein the functional brain part location unit compares corresponding voxels of the MRI image signals and a differential of the comparison is provided as an image of brain part functioning.

13. (New) The apparatus of claim 1 wherein the functioning part location calculating means identifies a thalamus, a pons, or a putamen of the brain as functioning.

14. (New) The system of claim 10 wherein the event identification support unit uses FFT to output the display of data on the frequency of occurrences of an event.

15. (New) The system of claim 10 wherein the event identification support unit identifies spindles.

16. (New) The system of claim 10 wherein the event identification support unit identifies K-complexes.